

AMENDMENTS TO CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

WHAT IS CLAIMED IS:

1. (Currently Amended) An insert molding die for a hollow component, comprising:  
an upper die;  
a lower die arranged under the upper die, wherein the upper die and the lower die forms a cavity which accommodates the hollow component and is charged with molten resin;  
a plurality of upper-die pin members disposed on the upper die movably up and down, wherein the upper-die pin members hold the hollow component in the cavity;  
upper-die urging means disposed on the upper die to urge the upper-die pin members downwardly so that the upper-die pin members project from the upper die by opening the upper die and the lower die and the upper-die pin members pressed into the upper die by closing the upper die and the lower die, the upper-die urging means including a first spring for urging a selected upper-die pin member downwardly and a second spring for urging the selected upper-die pin member upwardly, an urging force of the first spring being larger than that of the second spring;  
a plurality of lower-die pin members disposed on the lower die movably up and down so as to oppose the upper-die pin members respectively, wherein the lower-die pin members hold the hollow component in the cavity in cooperation with the upper-die pin members to form a gap between the hollow component and the lower-die; and  
lower-die urging means disposed on the lower die to urge the lower-die pin members upwardly so that the lower-die pin members project from the lower die by opening the upper die and the lower die and the lower-die pin members pressed into the lower die by closing the upper die and the lower die, the lower-die urging means including a third spring for

urging a selected lower-die pin member upwardly and a fourth spring for urging the selected lower-die pin member downwardly, an urging force of the third spring being larger than that of the fourth spring.

2. (Currently Amended) The insert molding die of claim 1, wherein the upper-die urging means and the lower-die urging means comprise additional springs respectively.

3. (Original) The insert molding die of claim 1, wherein the upper-die urging means and the lower-die urging means comprise pneumatic cylinders respectively.

4. (Original) The insert molding die of claim 1, wherein the upper-die urging means and the lower-die urging means comprise hydraulic cylinders respectively.

5. (Original) The insert molding die of claim 1, wherein the upper die is provided with injection means adapted to inject molten resin into the cavity.

6. (Original) The insert molding die of claim 5, wherein the lower die is provided with another injection means adapted to inject molten resin into the cavity.

7. (Withdrawn) An insert molding method for molding a hollow component, comprising the steps of:

preparing a molding die comprising an upper die and a lower die, at least either one of the upper die and the lower die being movable to and from the other die;

separating the upper die from the lower die thereby opening the molding die;

arranging a hollow primary molded piece in the lower die while retaining the hollow primary molded piece apart from a concave bottom surface of the lower die;

starting to inject molten resin into the molding die while retaining the hollow primary molded piece apart from the concave bottom surface of the lower die thereby filling up a space between the hollow primary molded piece and the concave bottom surface with the molten resin before completely closing the molding die; and

continuing to inject the molten resin into the molding die even after closing the molding die.

8. (Withdrawn) The injection molding method of claim 7, further comprising:

preparing upper-die pin members disposed on the upper die movably up and down, upper-die urging means disposed on the upper die to urge the upper-die pin members downwardly, lower-die pin members disposed on the lower die movably up and down so as to oppose the upper-die pin members respectively, and lower-die urging means disposed on the lower die to urge the lower-die pin members upwardly, and

setting the hollow primary molded piece on the lower-die pin members when arranging the hollow primary molded piece in the lower die.

9. (Withdrawn) The injection molding method of claim 7, wherein

the molten resin is injected from the upper die in injecting the molten resin into the molding die.

10. (Withdrawn) The injection molding method of claim 9, wherein

the molten resin is further injected from the lower die in injecting the molten resin into the molding die.

11. (New) The insert molding die of claim 1, wherein the selected lower-die pin member is provided with a locate pin for positioning the hollow component in the cavity.